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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,463	06/20/2001	Dov Ingman	50761.010100	9653

22191 7590 06/02/2005

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EXAMINER	
KANG, JULIANA K	

ART UNIT	PAPER NUMBER
2874	

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/884,463	INGMAN ET AL.	
	Examiner	Art Unit	
	Juliana K. Kang	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-30 and 32-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *46* is/are allowed.

6)☒ Claim(s) *1-8, 10-30, 32-35, 37-45 and 47-62* is/are rejected.

7)☒ Claim(s) *36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. Applicant's communication filed on March 3, 2005 has been carefully studied by the Examiner. The arguments advanced therein regarding rejections of claims over Imamura are persuasive and thus rejections over Imamura are hereby withdrawn. However, the arguments with respect to the Tsubaki reference are not persuasive and the rejections based upon prior art made of record in the previous office action are hereby maintained. Thus, this action is made final. Claims 1-8, 10-30 and 32-62 are pending the application.

Allowable Subject Matter

As indicated in the previous Office action claim 46 is allowable and claim 36 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-8, 10-30, 32-35, 37, 38, 42-45, and 47-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsubaki et al (U.S. Patent 5,790,742).**

Regarding claims 1, 6, 7, 10, 11, 33, 35, 48, 52, 54, 55, 58, and 59, Tsubaki et al disclose an optical fiber comprising a core made of quartz glass (silica glass, see column 4 line 67); and a cladding layer comprised of at least two layers (2a, 2b) wherein a first clad layer (2a) can be made of acrylic resins (see column 6 lines 20-25, acrylic resins is hydrophilic resins [see IGA et al US 2001/0018568 A1 paragraph 0051]) and a second clad layer (2b) is made of hydrophobic silica aerogel particles (see column 5 lines 5-15 and column 6 lines 8-9). However, Tsubaki et al do not clearly state that the first clad layer is made of nano-particles. Tsubaki et al teaches that using nano-particles provide transparency and minimize optical loss by absorption or scattering of light (see column 5 lines 15-19). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use nano-particles for the first clad layer to provide transparency and minimize optical loss for better efficiency in optical transmission. The hydrophilic first clad layer and the hydrophobic second clad layer inherently have different hydrophobicity characteristics.

Regarding claim 8, since claim 8 only further limits the metallic oxide which is one of the cladding layer nano-particles wherein the nano-particles can also be silica nano-particles, the claimed limitations are essentially disclosed by Tsubaki et al.

Regarding claims 2, 42, 49 and 51, Tsubaki et al disclose the cladding layer comprising a filler (air, see column 5 line 54).

Regarding claims 4 and 34, Tsubaki et al disclose an over clad layer (5, see column 6 lines 26-28).

Regarding claim 14, Tsubaki et al disclose that the cladding layer (nano-particles having air) can be made of resins (see column 6 line 24).

Regarding claims 16, 17, 19-21 and 56, as described above Tasubaki et al teach the claimed invention including a plurality of cores (1); and a cladding layer (2a or 2b) wherein the plurality of cores are embedded within the second clad layer (see Fig. 6D and see Fig. 10c). However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the common first cladding layer for the plurality of cores instead of individually coated cores in Tsubaki et al in order to reduce the manufacturing cost and the process.

Regarding claims 22, 23, 25, 26, 27, 29, 30, 32, 43 and 57, as described above Tsubaki et al teach the claimed invention except a substrate. Placing an optical fiber on a substrate is well known in the art to secure or to support an optical fiber. Thus, it would have been obvious to one with ordinary skill in the art at the time the invention was made to place Tsubaki et al's optical fiber on a substrate to either secure or support the optical fiber for further coupling with other optical elements. Tsubaki et al disclose having a plurality of stacked cores (Fig. 6D) thus having a plurality of stacked waveguides on a substrate would also have been obvious to one with ordinary skill in the art.

Regarding claims 38 and 41, Tsubaki et al teach the claimed method limitations (see column 5 lines 32-39).

Regarding claims 12, 13, 37, 44, 45 and 47, as described above Tsubaki et al teach the first cladding (inner cladding) made of hydrophilic material and the second

cladding (outer cladding) made of hydrophobic silica material . Tsubaki et al does not limit the cladding material to any specific material and Tsubaki et al further teach using different materials for the cladding layer (see column 6 lines 20-25). Metallic oxide nano-particles are known as hydrophilic material in the art. Thus using metallic oxide nano-particles or any other material having hydrophilic characteristic including molybdenum disulfide in Tsubaki et al would have been obvious to one having ordinary skill in the art as long as the particles provide the hydrophilic characteristics.

Regarding claims 3, 18, 24 and 28, as described above, Tsubaki et al disclose the cladding layer including silica nano-particles comprising air which provides more flexibility (see column 5 lines 57-59). Claimed materials such as polymer, synthetic oil, poly-siloxane and Teflon are well known materials used for the optical fiber cladding or coating layer to increase the flexibility of the optical fiber. Thus, one with ordinary skill in the art would have easily recognize the use of other materials such as polymer, synthetic oil, poly-siloxane and Teflon in Tsubaki et al to improve the flexibility of the optical fiber.

Regarding claim 5, as described above Tsubaki et al disclose the overclad layer. However, Tsubaki et al do not specifically teach Teflon. Tsubaki et al teach that overclad material is not particularly limited to any specific material (see column 6 lines 26-36). Teflon is a well-known material used in an optical fiber art as a coating material. Thus, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use a well known coating material such as Teflon in Tsubaki et al since it has been held to be within the general skill of a worker in the art to select a

known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding claims 15 and 50, using thixotropic material is well known in the art to block moisture. Tsubaki et al's cladding layer prohibits moisture or water to enter and Tsubaki et al further teach that the material used for the clad layer is not limited to any particular material. Thus it would have been obvious to one with ordinary skill in the art to use any type of moisture blocking material including thixotropic material in Tsubaki et al as long as the cladding layer blocks moisture.

Regarding claim 60, Tsubaki et al's cladding layer (first clad layer) made of one material would inherently provide an effective refractive index that is approximately unity within that cladding layer.

Regarding claim 61, Tsubaki et al is silent about the claimed fiber size. It would have been an obvious matter of design choice to have the claimed fiber size, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges invoves only routine skill in the art.

Regarding claim 62, because of the voids between the nanoparticles they are inherently movable.

4. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsubaki et al **as applied to claim 33 above, and further in view of Kanda et al (U.S. Patent 4,740,055).**

As described above, Tsubaki et al disclose coating an optical fiber core with nano-particles. However, Tsubaki et al do not positively teach the claimed coating

methods. Kanda et al teach coating an optical fiber with polymer particles having particle sizes of 10nm to 6000nm (see column 3 line 1) wherein the particles are prepared using an azeotropic distillation (drying) method (see column 2 lines 42-48). Thus, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use any particle coating method including Kanda et al's azeotropic distillation method in Tsubaki et al in order to coat the fiber core with nano-particles.

5. **Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsubaki et al as applied to claim 33 above, and further in view of Kanda et al (U.S. Patent 4,740,055).**

Tsubaki et al disclose coating an optical fiber core with nano-particles. However, Tsubaki et al do not positively teach the method step of drawing. Freidinger et al teach coating an optical fiber by drawing a coating material in the form of paste. Thus, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use any coating methods including a drawing method in Tsubaki et al as taught by Freidinger et al to coat an optical fiber with a coating material.

6. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsubaki et al as applied to claim 33 above, and further in view of Minemoto et al (U.S. Patent 5,699,461).

As described above, Tsubaki et al disclose coating an optical fiber core with nano-particles. However, Tsubaki et al do not positively recite claimed coating methods. Minemoto et al teach coating the fiber by applying the optical fiber with a

polymer paste (filler) comprising fine particles and than drying (see column 13 lines 46-54). Thus, it would have been obvious to one with ordinary skill in the art to use any coating method including the method of applying and drying in Tsubaki et al as taught by Minemoto et al to coat the fiber with polymer that includes fine particles.

Response to Arguments

7. Applicant argues that Tsubaki does not teach, disclose or suggest importing hydrophilic nano-particles into the first clad layer 2a and to the contrary, Tsubaki specifically teaches imparting a hydrophobic property to the silica particles and hence teaches away from using hydrophilic particles at all. The Examiner does not agree with this. Tsubaki clearly teaches having a plurality of clad layers and further teaches the outermost clad layer 2b that is made up by the silica aerogel (column 5 line 60-65) which is hydrophobic (col. 5, line 9) and Tsubaki further teaches that the material of the clad layer other than the outermost layer (which would be 2a, first clad) is not particularly limited, but the material with excellent transparency which does not generate light scattering or absorption is preferable, and examples include acrylic resin which is hydrophilic as stated above (see column 6 lines 20-26). Thus as discussed above, even though Tsubaki is silent about using nanoparticles for the first clad layer Tsubaki clearly teaches using the material with low light scattering or absorption. Since Tsubaki teaches using nanoparticles suppresses optical loss by absorption or scattering of light

to minimum (see column 5 lines 15-19), it would have been obvious to one having ordinary skill in the art at the time the invention was made to use nanoparticles of acrylic resin for the first clad layer.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (571) 272-2348. The examiner can normally be reached on Mon. & Fri. 10:00-6:00 and Tue. & Thur. 10:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JULIANA KANG
PRIMARY EXAMINER